

Description and Application

The Electro-Voice FRX-122 is an unusually compact, two-way, high-efficiency, constant directivity speaker system designed for indoor sound reinforcement in commercial installations such as churches, meeting halls, auditoriums and for surround purposes in movie theaters. Capable of producing sound pressure levels (SPL) in excess of 123 dB at 1 meter, the FRX-122 will give full-bandwidth reproduction without sacrificing sonic quality. The FRX-122 features a 110° x 60° horn with asymmetrical vertical dispersion that aims horn output 15° down relative to the front baffle, when the enclosure is oriented in the standard "woofer on the bottom" fashion. This is useful in achieving uniform high-frequency coverage in those many applications where esthetic considerations dictate that a compact speaker system be placed against a wall but speaker output should be aimed downward for best audience coverage. (For more information, see Figure 8 and the Horn Orientation Notes section.) The DH2T compression driver provides smooth extended response to 20 kHz and features a titanium diaphragm and a unique convex-drive Time Path™ phasing plug structure (U.S. Patent #4,525,604).

The optimally vented bass section of the FRX-122 is designed using Theile-Small

parameters for efficient performance to below 75 Hz and utilizes a 300-watt DL12SX 12-inch woofer to provide high excursion with low coloration.

The FRX-122 is provided with a passive crossover which features 12 dB/octave slopes centered at 1.8 kHz and EV's self-resetting PRO™ circuit to guard the compression driver against damage. The system can be easily converted to the biamp mode by removing the input-panel assembly (six screws) and moving the four jumpers as indicated on the crossover. When used in biamp mode the woofer uses pins 1+ and 1- and the tweeter uses pins 2+ and 2-.

The enclosure is constructed from baltic birch plywood and is available in three alternative finishes; FRX-122-BL (black textured paint), FRX-122-WH (off-white textured paint) and FRX-122-UN (unfinished and ready to stain). The grille is constructed from MDF and is covered with black cloth (FRX-122-BL) or alternatively natural cloth (FRX-122-UN and FRX-122-WH).

Ring-Mode Decoupling (RMD™)

The FRX-122 controls both acoustical and mechanical ring modes to provide dramatically increased intelligibility, using techniques learned from the development of the

FRX-122

High-Output, Compact Speaker System

- 12-inch, two-way design
- 110° x 60° asymmetric horn aims HF output down 15° relative to front baffle
- 300 watts long-term power capacity
- Ring-Mode Decoupling™
- Quick, convenient suspension
- OmniMount® Series 100 compatible¹
- DH2T driver
- Passive or biamp
- Available in black (BL), white (WH) and unfinished (UN)

¹ OmniMount® is a registered trademark of OmniMount Systems.

Electro-Voice X-Array™ concert speakers. There is much less coloration of the sound from resonating sources, leaving only the intended sound to be heard by the audience.

Frequency Response

The FRX-122 axial frequency response was measured in Electro-Voice's large anechoic chamber at a distance of 10 feet with a swept sine-wave input (see Figure 1). The two responses show the two alternate rotational positions of the high-frequency horn.

Directivity

The directional characteristics of the FRX-122 were measured in Electro-Voice's large anechoic chamber. The test signal was one-third-octave filtered pink noise at the frequencies indicated. A full spherical measurement system was used. All directional information was measured at 20 feet.

Figure 2 illustrates the horizontal and vertical polar responses.

Figure 3 shows the horizontal and vertical beamwidths. Beamwidth is the angle at which the horizontal and vertical polar responses have decreased in level by 6 dB when compared with the axial frequency response.

Figure 4 illustrates the total directivity of the FRX-122. The directivity factor $R_0(Q)$ is the

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relative value, at a point, of the FRX-122 output when compared to an ideal spherical response. The directivity index, D_p , is calculated by $D_i = 10 \log_{10} R_g$.

Horn Orientation Notes

Figure 8 shows front and side views of the FRX-122 in the standard, woofer-at-the-bottom orientation. In this condition, high-frequency output is aimed down by 15°. Of course, rotating the system to place the woofer at the top will reverse this aiming. Alternatively, the horn alone may be rotated 180° by first removing the six #1-32 x ¼-inch Philips-head screws which hold the horn/driver assembly to the front baffle, then rotating and reinstalling the assembly. This alternative has the advantage of maintaining an upright orientation of the FRX-122 input panel and nameplate.

Power-Handling Test

Electro-Voice components and systems are manufactured to exacting standards, ensuring they will hold up, not only through the most rigorous of power tests, but also through continued use in arduous, real-life conditions. The EIA Loudspeaker Power Rating Full Range (EIA RS-426-A 1980) uses a noise spectrum which mimics typical music and tests the thermal and mechanical capabilities of the components. Electro-Voice will support relevant additional standards as they become available. Extreme, in-house power tests, which push the performance boundaries of the system, are also performed and passed to ensure years of trouble-free service.

Specifically, the FRX-122 passes EIA RS-426-A 1980 with the following values:

$$R_{SR} = 6.0 (1.15 \times R_g) \text{ ohms}$$

$$P_{E(MAX)} = 300 \text{ watts}$$

$$\text{Test voltage} = 42.4 \text{ volts rms,}$$

$$84.8 \text{ volts peak}$$

The "peak" power-handling capacity of a woofer is determined by the peak test voltage amount. For the FRX-122 an 84.8-volt peak test voltage translates into a 1,200-watt short-term-peak power-handling capacity. This is the equivalent of four times the "average" power-handling capacity, and is a peak that can be sustained for only a few milliseconds. How-

ever, this sort of short duration peak is very typical in speech and music. Provided the amplifier can reproduce the signal accurately, without clipping, the system will also perform accurately and reliably, even at these levels.

Use in Cinemas

The FRX-122 has features which make it particularly suitable for use in cinema surround sound. It is black to complement most theater interiors. The WCB-1 U-bracket provides a cost-effective and safe method of suspending the FRX-122 at the correct (15°) angle. The high dynamics and high power handling offered by professional-grade components make it especially suitable for digital signals.

Suspending the FRX-122

The FRX-122 is fitted with ¼-20 threaded inserts and can be suspended in two ways:

1. The WCB-1 is a U-bracket designed for the FRX-122 that facilitates either horizontal or vertical mounting -See Figure 6.
2. OmniMount® Series 100 support system. Four ¼-20 threaded inserts are located in the rear panel to allow the use of the OmniMount® Series 100 support system. A safety chain should be used to ensure safe operation. (Obtain OmniMount® specifications for full instructions.)

It is the responsibility of the installer to ensure the integrity of the mounting surface. The grille of the FRX-122 is securely attached on the front of the cabinet with four screws.

Architects' and Engineers' Specifications

The loudspeaker system shall be a two-way full-range design consisting of a 12-inch woofer, a high-frequency compression driver on an injection-molded constant-directivity horn and a dividing network having a crossover frequency of 1.8 kHz. The system shall be configurable in a biamp mode through internal switches in the crossover network. The loudspeaker shall meet the following performance criteria; power handling, 300 watts, based upon ANSI/EIA RS-426-A 1980 standard for full-range loudspeaker systems; frequency response smooth and usable at high SPL levels from 75 Hz to 20 kHz; pressure sensitivity, 99 dB SPL for 1 W at 1 m; imped-

ance, 8 ohms nominal, 6 ohms minimum. The system shall have a distribution pattern with 110° nominal horizontally from 3 kHz to 20 kHz and 60° nominal vertically from 3 kHz to 20 kHz with asymmetrical coverage in the vertical plane, aiming 15° down when the enclosure is oriented with the high-frequency horn at the top. The enclosure shall be constructed from Baltic birch plywood and braced appropriately, and the grille will be constructed from MDF and cloth covered. The dimensions shall be 58.4 cm (23.0 in.) high by 45.1 cm (17.8 in.) wide by 22.9 cm (9.0 in.) deep. Net weight shall be 20.9 kg (46 lb). The system shall be the Electro-Voice FRX-122-BL (black texturlac paint with black cloth grille), FRX-122-WH (white texturlac paint with natural cloth grille) or the FRX-122-UN (unfinished ready for staining with natural cloth grille).

Limited Warranty

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice Service or any of its authorized service repre-

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representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice Service at 600 Cecil Street, Buchanan, MI 49107 (800/234-6831 or FAX 616/695-4743). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of

incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice Speakers and Speaker Systems are guaranteed against malfunction due to defects in materials or workmanship for a period of five (5) years from the date of original purchase. The Limited Warranty does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from improperly designed enclosures. Electro-Voice active electronics asso-

ciated with the speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

For warranty repair or service information, contact the service repair department at: 616/695-6831 or 800/685-2606.

For technical assistance, contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard Time.

Specifications subject to change without notice.

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Figure 1—Axial Frequency Response
(anechoic environment, 1 watt at 1 meter into mid band)

--- Horn Up
— Horn Down

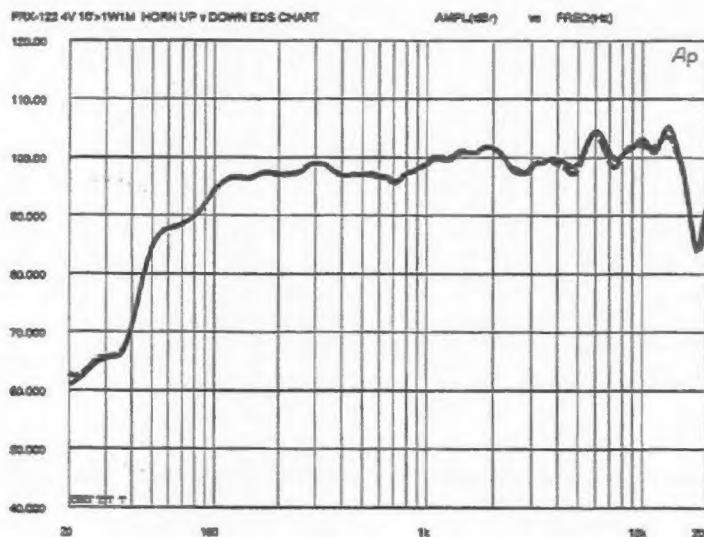
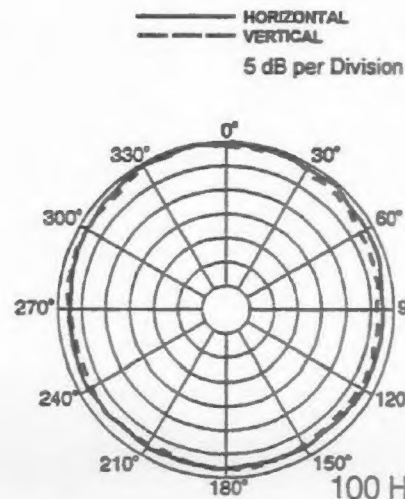
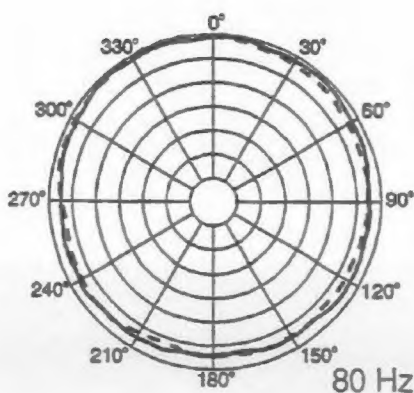
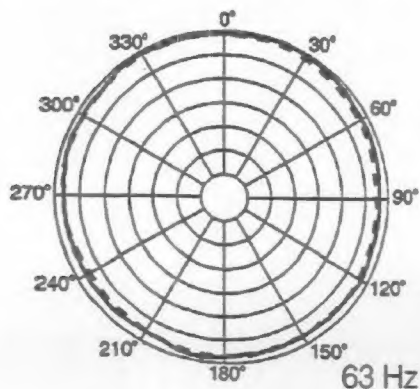
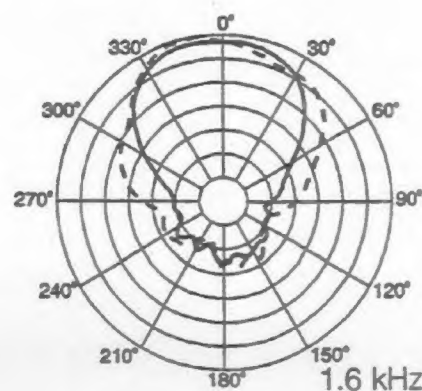
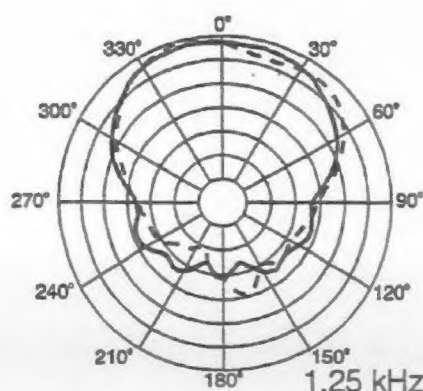
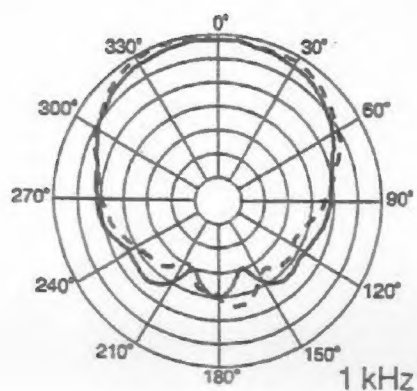
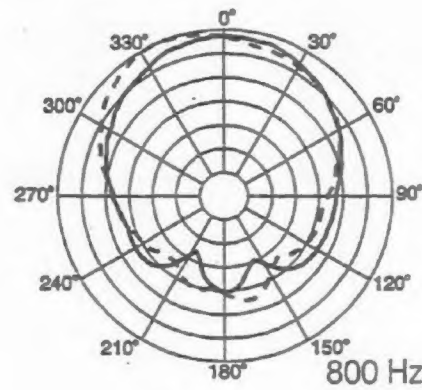
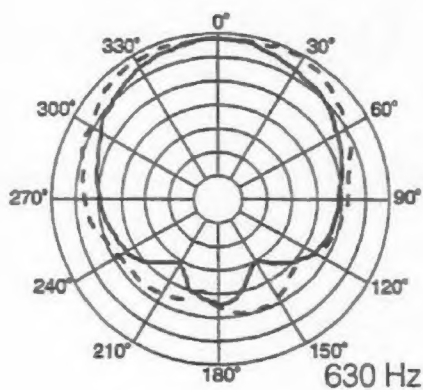
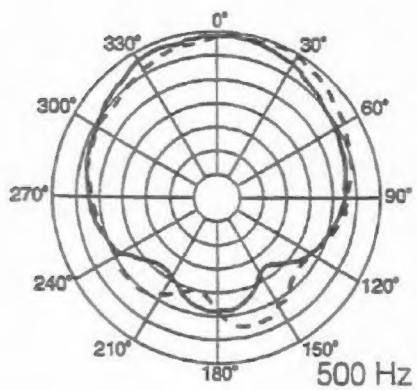
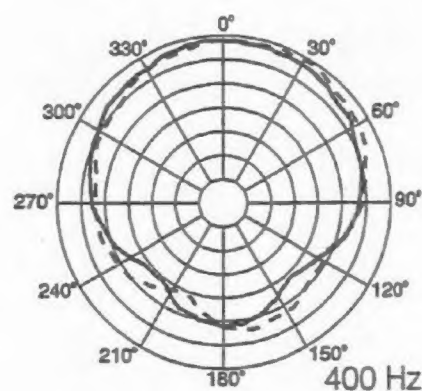
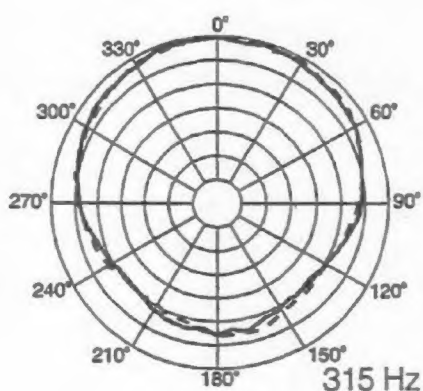
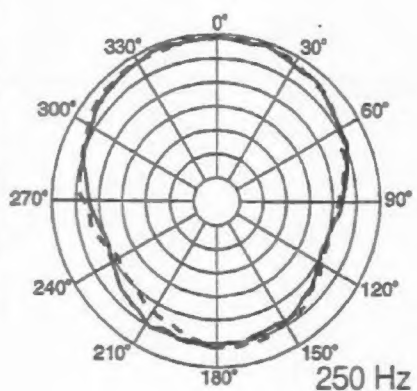
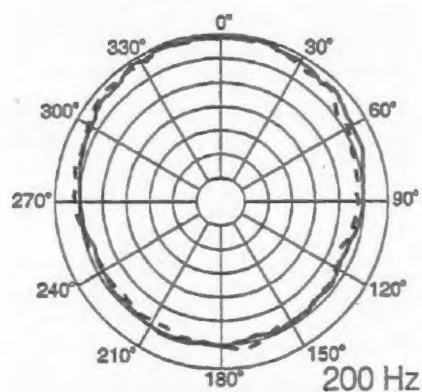
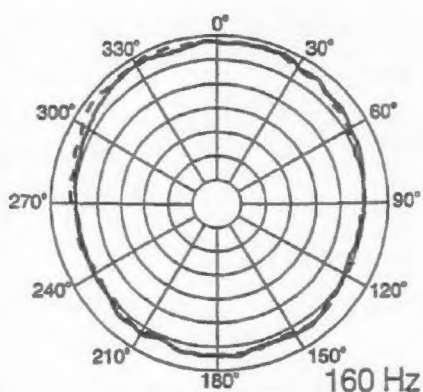
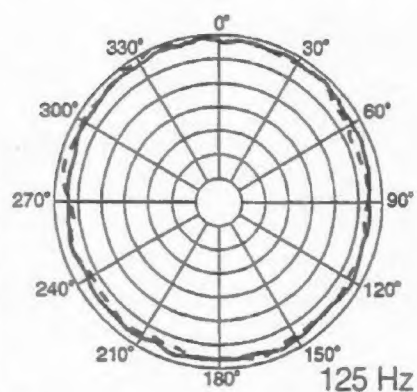


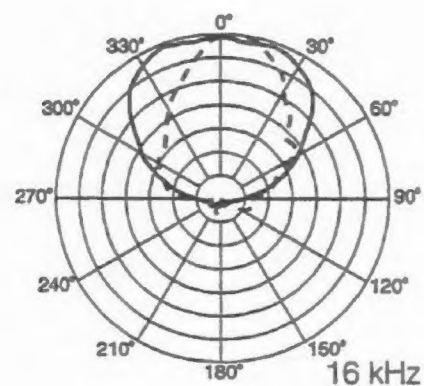
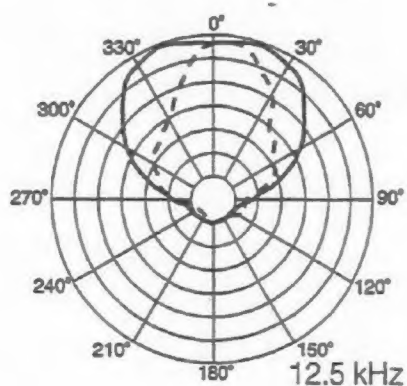
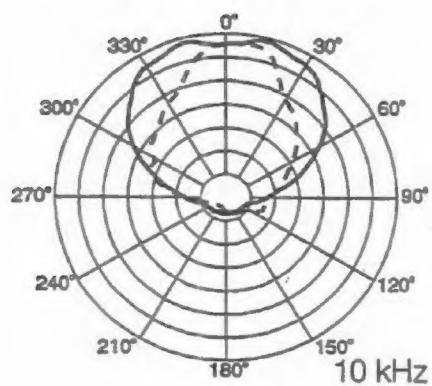
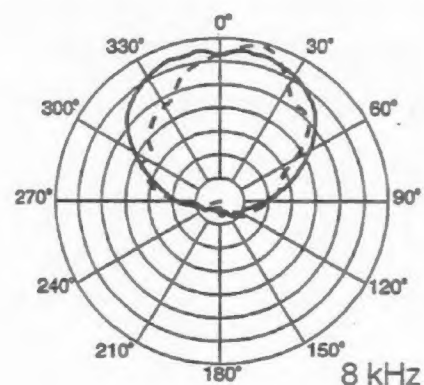
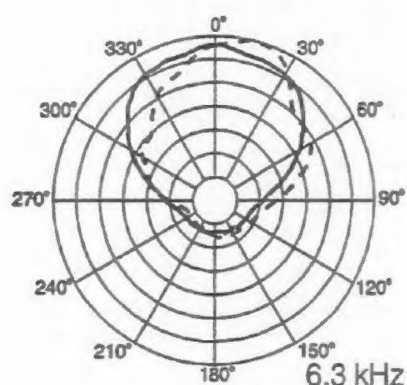
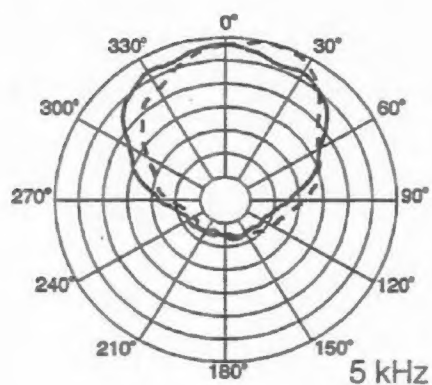
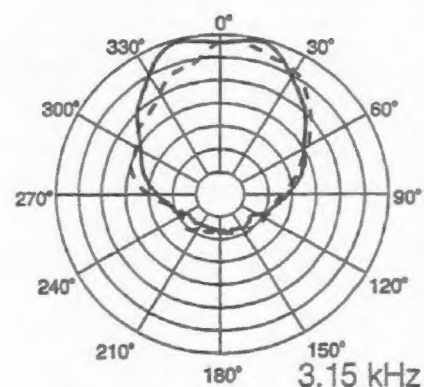
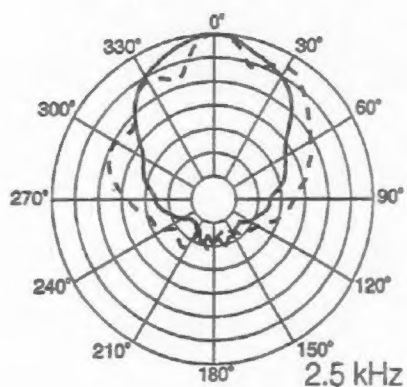
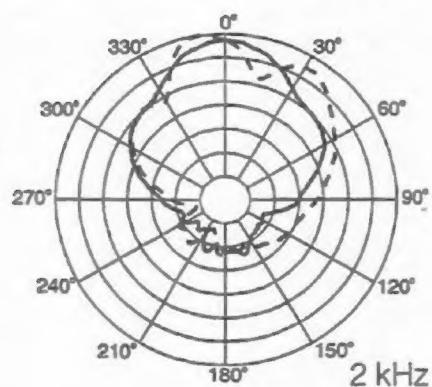
Figure 2—One-Third-Octave Polar Response
(anechoic environment)



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Figure 3—Beamwidth vs.
Frequency (anechoic environment)

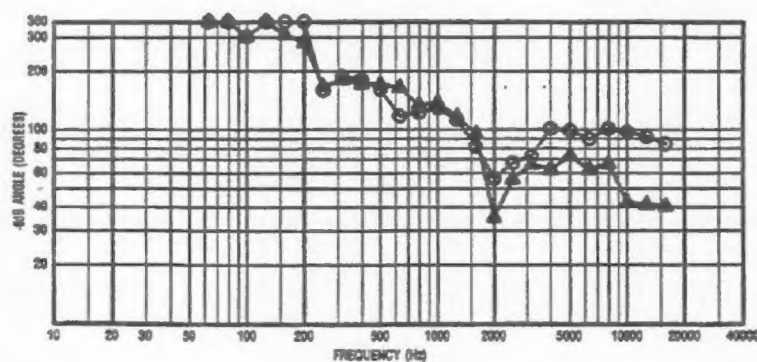


Figure 4—Directivity vs.
Frequency (anechoic environment)

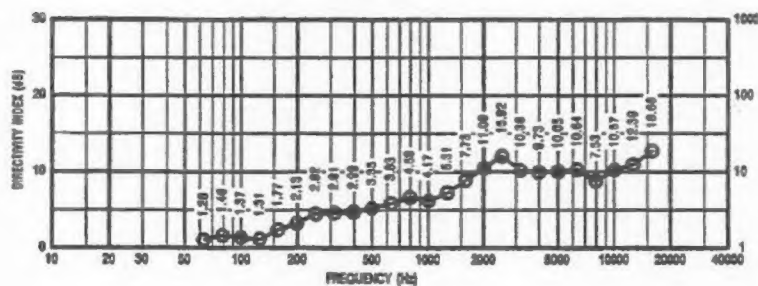
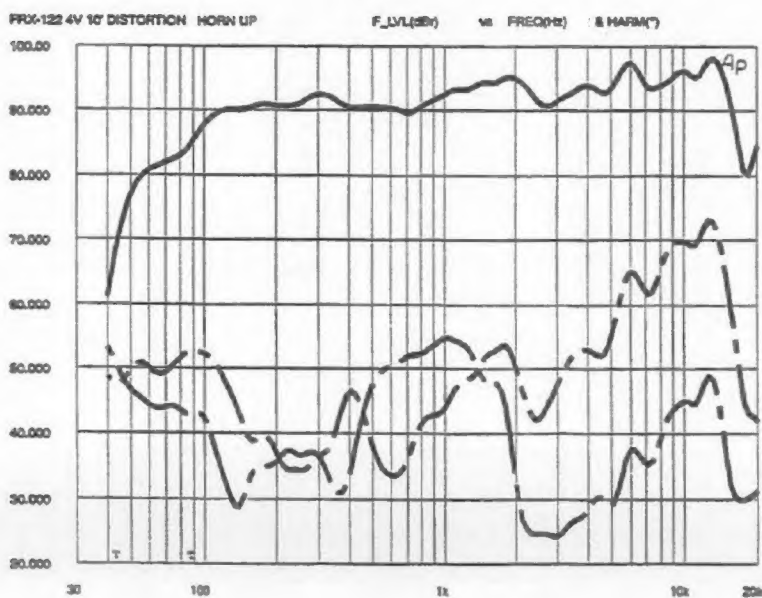


Figure 5—Harmonic Distortion, 0.1
Rated Power Input (30 watts)



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Figure 6—Mounting the FRX-122 Using the WCB-1 Bracket

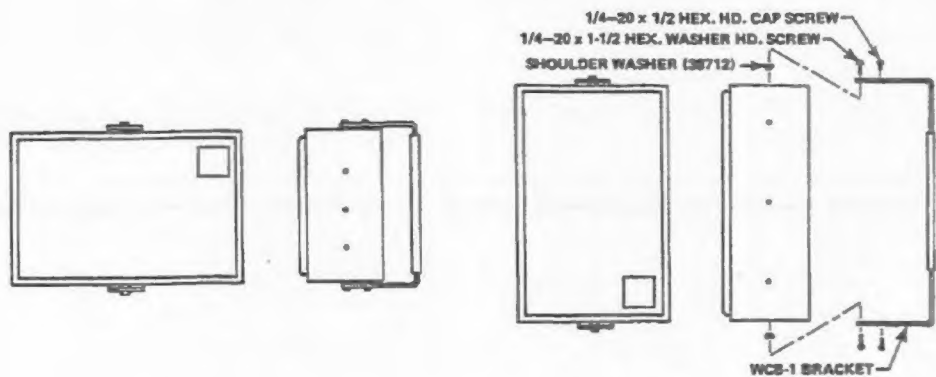


Figure 7—Impedance

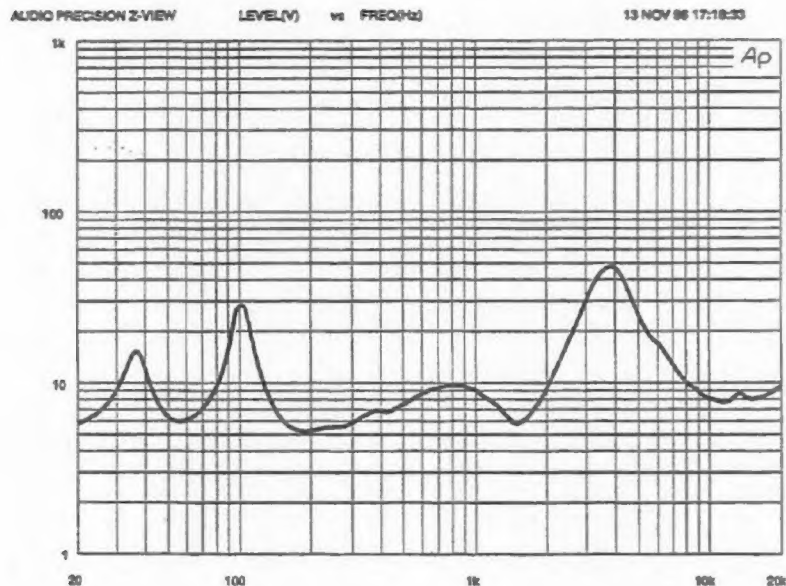
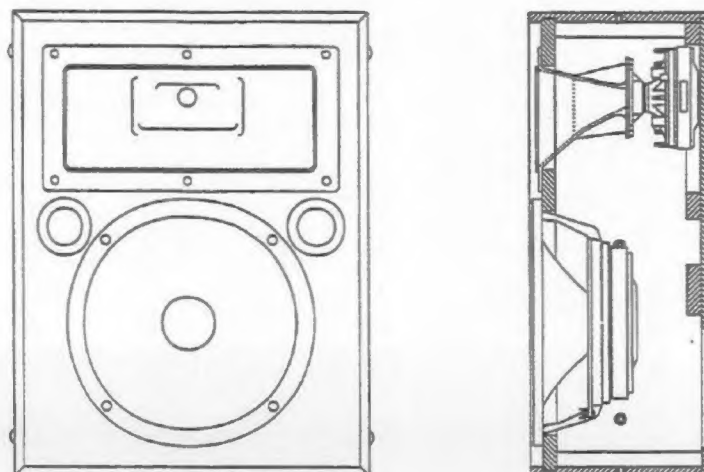


Figure 8—FRX-122 Front and Side Views Showing Downward Aiming of HF Horn in Standard, Woofer-at-the-Bottom Enclosure Orientation (see Horn Orientation Notes section)



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Specifications

Axial Frequency Response (swept sine wave, 4 volts at 10 feet on axis, anechoic environment normalized for 1 watt/1 meter; see Figure 1):

75-20,000 Hz

Low-Frequency 3-dB-Down Point:

75 Hz

Usable Low-Frequency Limit (10-dB-down point):

48 Hz

Half-Space Reference Efficiency:

4.5%

Long-Term Average Power-Handling Capacity (per ANSI/EIA RS-426-A 1980; see Power-Handling Capacity section):

300 watts

Maximum Woofer Acoustic Output:

13.5 watts

Sensitivity (SPL at 1 m, 1 W into nominal impedance, anechoic environment, band-limited pink-noise signal, 100-15,000 Hz):

99 dB

Beamwidth (angle included by 6-dB-down points on polar responses, horizontal and vertical planes, indicated one-third-octave bands of pink noise; see Figure 3),

250-1,600 Hz:

140° ±50°

3,150-16,000 Hz,

Horizontal:

110° +0°/-15°

Vertical:

60° -10°/-20°

Directivity Factor R_0 (Q), 3,150- to 16,000-Hz Median (see Figure 4):

11.2 (+7.5, -3.6)

Directivity Index D_p , 800- to 16,000-Hz Median (see Figure 4):

10.4 dB (+2.3 dB, -1.6 dB)

Distortion, 0.1 Full Power Input (see Figure 5),

Second Harmonic,

100 Hz:

3.9%

1,000 Hz:

2.2%

10,000 Hz:

8.9%

Third Harmonic,

100 Hz:

3.8%

1,000 Hz:

1.9%

10,000 Hz:

1.8%

Transducer Complement,

Low-Frequency:

DL12SX 12-inch woofer

High-Frequency:

DH2T Driver

Box Tuning Frequency:

65 Hz

Crossover Frequency:

1,800 Hz

Crossover Slope:

12 dB per octave

Impedance,

Nominal:

8 ohms

Minimum:

6.0 ohms

Input Connections:

Full Range:

Neutrik Speakon® NL4MPR connector (pin 1+/1-) in parallel with barrier terminal strip

Biamp:

Neutrik Speakon® NL4MPR connector (pin 1+/1- LF, pin 2+/2 HF)

LF/Full Range

1+, 1-

HF/Biamp Mode

2+, 2-

Enclosure Construction and Colors,

Materials:

Birch plywood with removable cloth-covered grille

FRX-122-BL

Black textured paint, black grille

FRX-122-WH

White textured paint, natural grille

FRX-122-UN

Unfinished (ready to stain) natural grille

Grille:

Black or natural cloth on wood frame.

Suspension (see Suspending the FRX-122 section):

WCB-1 wall bracket

OmniMount® Series 100 support system

Optional Accessories:

WCB-1 cinema wall bracket

Dimensions,

Height:

58.4 cm (23.0 in.)

Width:

45.1 cm (17.8 in.)

Depth:

22.9 cm (9.0 in.)

Net Weight:

20.9 kg (46 lb)

Shipping Weight:

22.3 kg (49 lb)

Electro-Voice®

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